

Dear Chancellor of the Massachusetts Institute of Technology,

I heard about the impending research funding cuts; I now write to appeal for the ongoing research Professor Tsai is carrying out on Alzheimer's Disease. I know after hearing my justification you will not consider cutting back on the funding for her research.

Alzheimer's Disease, henceforth abbreviated as AD, is a neurological disease in which a patient's immune system attacks proteins (beta-amyloid proteins) that attach themselves to healthy neurons in the brain. The proteins actually form a plaque that is resistant to the immune systems attacks and thus the healthy neurons are destroyed instead, leaving the proteins intact. The tau protein, responsible for the structure of microtubules is abnormal in AD and thus causes the collapse of microtubule structures. The microtubules are in charge of aiding the transport from one part of the nerve cell to another of nutrients and other vital substances, subsequent to their collapse they cannot carry out this function.

All of this has extreme negative consequences on the human brain. Throughout the progression of the disease brain tissue shrinks, as shown by MRI scans. As the cells within the hippocampus begin to degenerate, short-term memory loss commences. As the disease spreads through the cerebral cortex, memory retention worsens as does judgment, and patients are prone to emotional outbursts and confusion.

Usually, those diagnosed with Alzheimer's live for 8-10 years with the disease. In the end, they often lack the ability to speak, recognize close relatives, feed themselves and even control bodily functions. Essentially, they have barely any function in the hippocampus and other key parts of the brain.

Professors Tsai's research is of paramount importance to the patients with this disease. The research she has done on the gene HDAC2 has been shown to reverse the effects of AD, including the retrieval of long-term memories and ability to learn, as well as a boost of cognitive function in mice. The research she has done with drugs that focus on the gene HDAC2, which regulates expression of genes related to plasticity (brain's ability to change due to an experience) and memory formation, have thoroughly improved the effects of AD in mice.

The researchers treated mice with symptoms similar to Alzheimer's with HDAC (histone deacetylase) inhibitors. HDAC2 comes from a family of 11 enzymes all related to regulating gene expression.

Professor Tsai has narrowed HDAC2 as the target of the inhibitors, which then enable synaptic plasticity and memory formation.

Other HDAC inhibitors are also being researched related to Huntington's, certain forms of cancer and chemotherapy drugs.

Professor Tsai argues that although HDAC inhibitors have not previously been used to treat Alzheimer's, HDAC2 still has the

ability to boost synaptic plasticity, synapse formation and memory formation. Those are all symptoms pertaining to Alzheimer's. Continued funding of her research is certain to be very applicable in helping victims of the disease and could even lead to a groundbreaking treatment.

Alzheimer's is a disease that comes out of nowhere. It could affect anyone regardless of race or gender. Improving the mental conditions of patients with this horrible disease should be a major concern for scientific researchers everywhere. Professor Tsai has already been successful with her research in the past. She is experienced and driven.

Cutting her funding would be a tragedy to people everywhere affected by the disease. Watching someone undergo this degenerative process is horrifying. Professor Tsai's research gives hope to all of the people affected by this disease.

Sincerely,
Lecy Campbell